**LAB: Where’s the Evidence?**

**Problem**: What observable changes happen when a chemical reaction occurs?

**Skill Focus**: Observing, predicting, and drawing conclusions

**Materials:**

4 100 mL beakers candle

Spatula sugar

Tongs clay

Matches sodium carbonate (powdered solid)

Graduated cylinder, 10ml Test tubes (2)

Aluminum foil, about 10-cm square Test tube rack

Dilute hydrochloric acid in a dropper bottle copper sulfate solution

Sodium carbonate solution

**Directions**: Preview steps for each reaction. Be sure to record your data on the data table.

**Part 1**

1. Put a pea-sized pile of sodium carbonate into a clean 100 mL beaker. Record the appearance of the sodium carbonate on the data table.
2. Observe a dropper containing hydrochloric acid. Record the appearance of the acid on the data table. **CAUTION**: *Hydrochloric acid can burn you or anything else it touches.* Wash spills with water.
3. Make a prediction about how you think the acid and the sodium carbonate will react when mixed. Record your prediction on the data table.
4. Add about 10 drops of hydrochloric acid to the sodium carbonate. Carefully swirl the beaker to mix the contents of the beaker. Record your observations on the data table.

**Part 2**

1. Fold up the sides of the aluminum foil square to make a small tray.
2. Use a spatula to place a pea-sized pile of sugar onto the tray.
3. Carefully describe the appearance of the sugar on your data table.
4. Secure a small candle on your desktop in a lump of clay. Carefully light the candle with a match, only after being instructed to do so by your teacher. **CAUTION**: *Tie back long hair and loose clothing.*
5. Predict what you think will happen when you heat the sugar. Record your prediction on the data table.
6. Use tongs to hold the aluminum tray. Heat the sugar slowly by moving the tray gently back and forth over the flame. Record your observations while the sugar is heating.
7. When you think there is no longer a chemical reaction occurring, blow out the candle.
8. Allow the tray to cool for a few seconds and set it down on your desk.
9. Record your observations of the material left in the tray.

**Part 3**

1. Put about 2ml of copper sulfate solution in one test tube. **CAUTION**: *Copper sulfate is poisonous and can stain your skin and clothes.* Do not touch it or get it in your mouth.
2. Put an equal amount of sodium carbonate solution in another test tube.
3. Record the appearance of both liquids on the data table.
4. Write a prediction of what you think will happen when the two solutions are mixed. Record your prediction on the data table.
5. Combine the two solutions into one test tube and record your observations. **Note- the reaction occurs quickly.**
6. **CAUTION**: *Dispose of the solution, as directed by your teacher.*
7. Wash your hands and clean up when you have finished working. Be sure to check with your teacher on how to dispose of each chemical.

**Analyze and Conclude**

1. Predicting. How did the results of each reaction compare with your predictions? Were your predictions correct? Did any of your results surprise you? Why or why not?
2. Observing and Interpreting Data. Consider the reaction in Part 1. How can you tell that a reaction occurred? How could you tell when the reaction ended?
3. Observing and Interpreting Data. Consider the reaction in Part 2. How can you tell that a reaction occurred? How did you know when to stop heating the sugar?
4. Observing and Drawing Conclusions. Was the product of the reaction in part 3 a solid, liquid or gas? How do you know? Are the properties of the products of this reaction the same as the properties of the reactants? Explain.
5. Drawing Conclusions. How do you know if new substances were formed in each reaction?
6. Communicating. Make a graphic organizer in the space below briefly describing each chemical change in this lab, followed by the evidence for the chemical change.

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|  | **Observations**  **Before Reaction** | **Predictions** | **Observations**  **During Reaction** | **Observations**  **After Reaction** |
| **Part 1**  **Sodium Carbonate (powder) + Hydrochloric Acid** |  |  |  |  |
| **Part 2**  **Sugar + Heat** |  |  |  |  |
| **Part 3**  **Copper Sulfate solution + Sodium Carbonate solution** |  |  |  |  |